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COVER SHEET FOR TECHNICAL MEMORANDUM

TITLE- Interim Report for AES Flight
Mission Assignment Plan -
Part VIII: Launch Facilities and
Equipment(U)

FILING CASE NO(S)- 218

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AUTHOR(S)- V. Muller
H. F. Stephens

FILING SUBJECT(S)- AES
ASSIGNED BY AUTHOR(S))

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ABSTRACT

The Saturn launch facilities and equipment have been examined to determine their adequacy to support the proposed AES program. Different launch complex configurations to meet the Saturn IB/Centaur requirements were considered, including conversion of LC-37A to Centaur capability and LC-34 and LC-37B to dual capability.

It was concluded that to meet the proposed launch schedule and to provide backup launch capability, both LC-34 and 37B, presently programmed for Saturn IB/Apollo capability, must be converted to dual Saturn IB/Apollo and Saturn IB/Centaur capability. The major conversion requirements are shown in Table I.

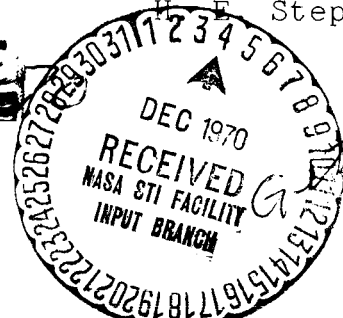
Presently programmed LC-39 facilities can support the maximum proposed Saturn V launch schedule of six/year at two months intervals. However, a higher sustained launch rate should not be planned for the programmed facilities until actual operating experience is obtained.

The spacecraft preparation and checkout GSE and facilities at KSC are capable of supporting the proposed launch rate of eight per year if no major spacecraft problems are encountered. However, manpower availability for this function is a problem area and will require special attention.

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{NASA-CR-111434} AES FLIGHT MISSION
ASSIGNMENT PLAN. PART 8 - LAUNCH FACILITIES
AND EQUIPMENT (Bellcomm, Inc.) 12 p

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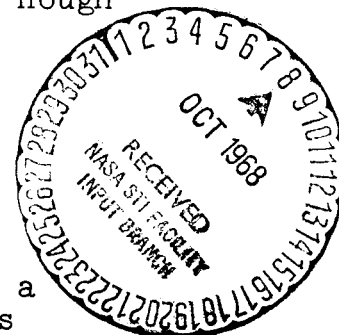
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1100 Seventeenth Street, N.W. Washington, D. C. 20036

SUBJECT: Martin Presentation on Analytical
Docking Dynamics Program at MSFC,
August 5, 1968 - Case 620

DATE: August 15, 1968

FROM: W. W. Hough

MEMORANDUM FOR FILE

The Martin Marietta Corporation is developing a computer program for analysis of the Apollo probe dynamics for MSFC under their Apollo Applications Payload Integration contract. They believe this program will be more flexible and accurate than the present MSC program which was developed by Boeing. On August 5, Mr. Carl Bodley of Martin described the analytical techniques he has used in developing this new program.

Martin has divided their efforts into two Phases. Phase I will result in a program for analysis of docking rigid chase and target vehicles by a 26 degree of freedom, non-linear model of the probe. Twenty-six equations of motion and 13 equations of constraint are solved by time-step numerical integration to give instantaneous values of 39 unknowns. These unknowns are the 26 generalized coordinates describing positions, and 13 generalized constraint forces which are treated as Lagrange multipliers. Constraints come about when the probe head or pitch arms contact the drogue, when the probe head is captured, and when the docking collars contact. The program has the capability for dynamic analysis through probe retraction, and includes models of active attitude control systems on the chase and target vehicles. This program, the product of Phase I, will be operational in October, 1968. Probe load histories output can be used in forced response analyses of elastic models of the chase and target vehicles to obtain internal loads.

Phase II is designed to combine the probe model developed in Phase I with elastic models of the chase and target vehicles, so probe loads and internal loads can be determined in one step. This approach accounts for the fact that probe forces are affected by the flexibilities of the vehicles and is therefore more accurate than the two-step approach, which is all that is presently available. For Phase II, new flexible body constraint equations must be developed, and the active attitude control system models must be modified to account for flexible body dynamics. The one-step program is to be completed by March, 1969. Internal loads, such as in OWS solar array attachments due to docking of the CM-SM, will be defined by May, 1969.

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W. W. Hough
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(NASA-CR-97060) MARTIN PRESENTATION ON
ANALYTICAL DOCKING DYNAMICS PROGRAM AT MSFC,
AUGUST 5, 1968 (Bellcomm, Inc.) 2 p

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Subject: Martin Presentation on
Analytical Docking
Dynamics Program at MSFC,
August 5, 1968 - Case 620

From: W. W. Hough

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